APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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MATTINGLY, STANGER, & MALUR, P.C.
1800 Diagonal Road
Suite 370
Alexandria, VA 22314

EXAMINER
MASDON, DAVID T

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/663,732	MURAKAMI, TOSHIHIKO
	Examiner	Art Unit
	David Masdon	2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any · earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 February 2006</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-18</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-18</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

PTOL-326 (Rev. 7-05)   Office Action Summary   Part of Paper No./Mail Date 03092006

DETAILED ACTION

Response to Amendment

1.   This Office Action is in response to applicant's communication filed on February 3, 2006, in response to PTO Office Action mailed on December 13, 2005. The applicants remarks and amendments to the claims and/or the specification were considered with results that follow.

2.   Claims 1-18 have been presented for examination in this application. In response to the last Office Action, claims 1, 2, 4, 12-14 and 16 haven been amended. As a result, 1-18 are now still pending in this application.

Response to Arguments

3.   Applicant's arguments, see page 10, filed February 2, 2006, with respect to the rejection(s) of claim(s) 1-18 under 35 USC 112 have been fully considered and are persuasive. Therefore, the 35 USC 112 rejection of claims 1-18 has been withdrawn.

4.   Applicant's arguments with respect to newly amended claims 1, 2, 13, 14 and 16 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 1- 9 and 11-18 rejected under 35 U.S.C. 103(a) as being unpatentable over Nahum (WO 01/80013) in view of Czajkowski (US 6,453,403).

As per claim 1, Nahum discloses a data transfer method in a computer system, comprising:

plural computers [(The SAN coupling an array of hosts) page 1, lines 12-13; Fig. 1, element 1]

plural memory devices; [(coupled to an array of storage devices) page 2, line 13; Fig. 1, element 4]

a relay device which connects the computers and the memory devices; [(via a Network switch) page 2, line 13-15; Fig. 1, element 2]

and a management device which manages the computers, the memory devices and the relay device, [(coupling a Storage Virtualization Manager) page 2, line 19; Fig. 1, element 3]

wherein the management device sets virtual memory areas of the memory devices for the plural computers and holds information on contents of the setting as first information, [(the SVM being configured for virtualization of the storage capacity) page 2, lines 21-25]

wherein the relay device holds second information which is created based upon the first information, [(managing I/O storage) page 10, lines 15-16]

wherein the virtual memory areas correspond to memory areas in the respective

memory devices or a memory area formed by combining memory areas in the memory

devices, and [(a virtual volume is a list pf physical storage areas or Stripe Areas concatenated and

presented to a host computer as a single Virtual storage device) page 1, lines 12-14]

wherein the relay device selects one virtual memory area based on the second

information, [(the network switch also centrally manages storage allocation) page 1, lines 32-33]

and, if the selected virtual memory area is formed by combining memory areas in

different memory devices [(for routing communications between hosts 1 and array of physical

storage devices) page 10, lines 15-17]

Nahum does not specifically disclose that if an unused memory area exists in the

memory device containing the selected one virtual memory area, the relay device

performs data transfer of data from a memory area of one of the different memory

devices other than the memory device containing the selected one virtual memory area

to the unused memory area of the memory device containing the selected one virtual

memory area. However, Czajkowski discloses an automatic memory management

system that utilizes memory compaction and defragmentation. (column 1, lines 24-39)

Czajkowski also discloses compacting free space by moving allocated blocks so that

they are together. (column 1, lines 40-58) The applicant discloses a method that is

identical to compacting memory or memory defragmentation. Czajkowski specifically

teaches a method of locating unused blocks of memory on a memory segment that is

partially used, and writing to that unused block of memory.

Nahum and Czajkowski are analogous art because they are from same field of endeavor, namely memory management. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the contiguous blocks of Czajkowski into the system of Nahum. The motivation for doing so would have been to provide an improved system and method for memory management. (Czajkowski; Column 3, lines 5-10)

Claims 2 and 14 are rejected with same rationale as claim 1. Czajkowski discloses an automatic memory management system that utilizes memory compaction and defragmentation. (column 1, lines 24-39) Czajkowski also discloses compacting free space by moving allocated blocks so that they are together. (column 1, lines 40-58)

As per claims 3 and 15, Nahum discloses the second information is updated based upon the first information. [(the first configuration portion and the second translation portion of the virtualization computer program being coupled in interactive operative association) page 6, lines 1-4]

As per claim 4, Nahum discloses third information indicating whether data transfer is incomplete or data has been transferred. [(SVM 3 runs a device-polling mechanism for a continuous status-update) page 11, lines 9-10]

As per claims 5 and 17, Nahum discloses the second information that has a flag indicating a state of whether or not data transfer is in progress [(the configuration table, including presence and permissions, is kept updated) page 14 lines 1-2] and the relay device that judges which of a data transfer source and data transfer destination should be accessed [(The SVM 3 maps the presence, availability and permission level granted to each host computer into a detailed configuration table of allocations also including data about the storage capacity available in the physical storage devices 4) page 11, lines 11-14]

As per claims 6 and 18, Nahum discloses a relay device that directly copies data of a memory area to a memory area of the data transfer destination. [(from they are routed directly to their physical addresses in the disk storage) page 16, lines 44-45]

As per claim 7, Nahum discloses a relay device that once copies data of a memory area to a memory area in the memory device prepared in advance for data transfer and, then, indirectly copies the data to a memory area of the data transfer destination. [(The Network Switch 2 is known in the art as a Network Hub for managing I/O storage and for routing communications between hosts 1 and an array of physical storage devices 4, also called the storage subsystems 4) page 10, lines 15-17]

As per claim 8, Nahum discloses a relay device that once copies data of a memory area to an unused memory area of the memory areas of the plural memory devices and, then, indirectly copies the data to a memory area of the data transfer destination. [(The Storage Manager module 50 then inspects the lists of the available physical devices

4 and of the Stripe Sets, to find one list containing the free space requested. If the space is found, then

the user request for storage is granted) page 16, lines 27-31]

As per claim 9, Nahum discloses a relay device that keeps data in the

virtual memory areas before data transfer temporally or for a designated period even

after the data transfer. [(Now, when the File System driver 64 issues an I/O request to a Virtual

Volume, the Volume driver 61 translates the request into one or more disk requests) page 16, lines

41-43]

As per claim 11, Nahum discloses a management device distributes the first

information to all the relay devices and uses the first information as an information

source of the second information. [(The SVM 3 also receives configuration-polling requests from

an SVM Driver, residing in each host 1, but not shown in Fig. 1.) page 11, lines 15-16]

As per claim 12, Nahum discloses that the second information is always

synchronized among the components constituted redundantly, whereby, in the case in

which one of the components constituted redundantly fails, the relay device uses the

second information of the other components constituted redundantly. [(The SVM Driver

operates a configuration polling mechanism, launched every few seconds (say 5 to 10 for example), for

the detection of changes occurring in the configuration of the SAN) page 11, lines 16-18]

Claims 13 and 16 rejected with the same rationale as claim 1.

7.   Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Nahum

(WO 01/80013) in view of Czajkowski (US 6,453,403) as applied above to claim 5, and

in further view of Barnett (US 6,971,016).

Nahum & Czajkowski does not disclose expressly a memory area in the relay

device. However, Barnett discloses a switch 130 that includes a non-volatile storage

device 304 (column 5, lines 1-2).

Nahum & Czajkowski and Barnett are analogous art because they are from the

same field of endeavor namely storage networks. At the time of the invention it would

have been obvious to a person of ordinary skill in the art to incorporate the switch

containing memory of Barnett into the system of Nahum & Czajkowski. The motivation

for doing so would have been to prevent data transfer bottlenecks. (Nahum; page 11,

line 39)

Conclusion

8.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to David Masdon whose telephone number is (571)272-

6815. The examiner can normally be reached on Monday - Friday, 7am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mano Padmanabhan can be reached on (571)272-4210. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

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Status information for unpublished applications is available through Private PAIR only.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

DM

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER